FINAL

FACILITIES RE-STUDY

Queue # 2003-G1

June 29, 2006

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Facilities Study for 2003-G1

1. DESCRIPTION

2003-G1 per a LGIP Facilities Study Agreement dated December 19, 2005, requested a facilities study for an interconnection to Western Area Power Administration's (Western) transmission system on the 115-kV Happy Jack – Miracle Mile transmission line. On February 19, 2006, during Western's performance of the Facilities Study, customer submitted via facsimile a request to transfer its interconnection queue position, and to assign its active Facilities Study Agreement, to 2003-G1. Western's Administrator approved the requested assignment on March 24, 2006; therefore, the interconnection customer is referred to herein as "2003-G1" or "customer".

On April 24, 2006, Western submitted a draft facilities study to 2003-G1 for review and comment. In a letter received May 8, 2006, 2003-G1 requested that Western perform a re-study of the Facilities Study to determine:

1. The possibility and additional incremental costs (if any) associated with expediting the design and construction of the facilities necessary for interconnecting the proposed generation facility and having it on-line on or before October 31, 2007.
2. Whether any facilities listed on the Facilities Study may be considered Stand Alone Network Upgrades eligible to be constructed under this option. 2003-G1 requested that Western delineate the facilities and costs associated with design and construction of the Interconnection Facilities, Stand Alone Network Upgrades (if applicable), and Network Upgrades.

Western performed a System Impact Study to determine the impacts, if any, to Western's transmission system of the proposed interconnection. The System Impact Study results found the proposed 50 MW generation would have no adverse affects on Western's 115-kV system in the area. It was further determined there was a maximum of 50 MW of generation that could be connected at this site without having to install transmission upgrades.

The requirement for the interconnection facility to Western's Happy Jack-Miracle Mile 115-kV line is a sectionalizing switchyard. Western recommends the installation of a 115-kV three breaker ring bus configuration to meet the sectionalization requirements.

This Facilities Study provides for general description and cost estimates for the Network upgrades required for the interconnection to Western's Happy Jack – Miracle Mile 115-kV transmission line. This includes all major 115-kV equipment, switchyard land, control building, relay and control system, communication, metering requirements and modifications to the transmission line. It was assumed the Interconnection Customer's Interconnecting Facilities such as a 115/34.5-kV transformer and protection equipment for 34.5-kV line was located within this switchyard, but is not included in this

study. Also not included in the study is the 34.5-kV transmission line nor any facilities related to the wind generation site.

Western's estimate for the total project cost of the required Transmission Provider's Network Upgrades is $3,213,000. This estimate is intended to be accurate to +/-20% as elected by the customer in Attachment A of the executed Facilities Study Agreement; however, as noted in that same Attachment, the customer is responsible for paying all actual costs for the work needed to physically and electrically interconnect the customer's facilities to Western's transmission system. Detailed cost break down is shown in Attachment A.

2. WIND GENERATION SITE

2003-G1 is developing a wind generation site to be known as 2003-G1 Power Wind Project. The site is near Rock River, Wyoming, about 35 miles northwest of Laramie, Wyoming. The total generation for the site is planned at 50 MW with 1.5 MW turbines.

The wind power will be generated at 590 volts, then transformed at each turbine to 34.5-kV. An underground collection system will be installed to connect each turbine together, and then an overhead 34.5-kV line is planned to a new substation interconnecting to Western's 115-kV transmission line.

3. Western's 115-kV System

Western owns, operates, and maintains two 115-kV transmission lines from the Cheyenne, Wyoming area to an area near the Kortes and Seminoe Dams, known as the Cheyenne – Miracle Mile and Happy Jack – Miracle Mile lines. The lines were constructed in 1939 and 1952, respectively, are each about 150 miles long, and run in a parallel path most of the distance. The Happy Jack – Miracle Mile 115-kV line has a thermal rating of 120 MVA, and the Cheyenne – Miracle Mile 115-kV line has a thermal rating of 109 MVA.

The transmission lines are constructed of wood H-frame structures. Due to the age of the line, the Cheyenne – Miracle Mile 115-kV is scheduled for rebuild in Western's long range capital investment plans beginning in 2007. Western performs preventative maintenance on the lines, including a testing and treatment program for the wood pole structures every 10 years. The lines are also monitored during periodic line patrols.

At the point of proposed interconnection, the lines are adjacent to each other and the Happy Jack – Miracle Mile line is located on the north side. The line is currently tapped in two locations; Oasis Tap, to serve load for Tri-State Generation & Transmission Association, and Gem City Tap to serve load for PacifiCorp. The adjacent line, the Cheyenne – Miracle Mile line is also tapped in two locations.

Western's General Requirements for Interconnections allows only one tap on a 115-kV line without sectionalizing breakers. Since this would be the third tap, sectionalizing breakers are required for the interconnection.

4. SUMMARY OF INTERCONNECTION FACILITIES

A new substation, to be known as Sand Hills Substation would be constructed directly adjacent to Western's transmission line, just south of Wyoming State Highway 13. The substation would be configured as a three breaker ring bus arrangement and would consist of the following equipment:

- Three - 115-kV power circuit breakers
- Seven - 115-kV manual gang-operated disconnecting switches
- Two - 115-kV manual gang-operated disconnecting switches with ground blades
- Instrument transformers
- Metering equipment and associated instrument transformers
- Station service equipment, including transformers, distribution switchgear, 125-VDC batteries and chargers.
- Relay and control equipment
- Communication equipment and tower
- Control Building
- Two - 115-kV transmission line tap structures

It is estimated the footprint of the substation would be about 300 x 300 feet in size, plus some additional land to allow for adequate drainage and approach spans for the transmission line. A short access road would be required from the state highway to the substation.

Primary station service power for the substation would be provided from the 34.5-kV line. Alternate station service would need to be identified and provided.

5. POWER FACTOR

Western's General Requirements for Interconnections requires the power factor for generation to be at unity at the point of interconnection. Since Western is supportive of alternate energy technologies, the power factor requirement for this wind generation facility will be 0.95 leading and 0.95 lagging. This power factor must be met at the point of interconnection, which is at the 115-kV transmission line. 2003-G1 will be responsible to remedy any adverse condition on Western's transmission system caused by their wind generation facility.

6. EQUIPMENT REQUIREMENTS

The following lists provided a general description of major components within the substation with approximate lead times for the major electrical equipment and features required for the substation. It should be noted the lead times are accurate at the date of the report, but can change quickly.

6.1. POWER CIRCUIT BREAKERS

Western utilizes SF6 type breakers as a standard. All breakers require bushing current transformers for relaying and indication metering. A minimum of two current transformers per bushing are required.

Three -115-kV, 1200 ampere, power circuit breakers are required for this project.

The lead time for power circuit breakers is currently about 28 to 32 weeks for 115-kV breakers.

6.2. DISCONNECTING SWITCHES

Disconnect requirements are:

- Two disconnect switches for each power circuit breaker are required to provide isolation for the breaker and a visible break for maintenance purposes. Six - 115-kV, 1200 ampere gang operated disconnection switches are required.

  A disconnect switch is required on each side of the power transformer to provide isolation and a visible break for maintenance purposes. One - 115-kV, 1200 ampere gang operated switch is required.

- Each transmission line terminated in the switchyard requires line disconnect switches with grounding blades. Two - 115-kV, 1200 ampere gang operated and one - 34.5-kV, 1200 ampere gang operated disconnect switches with ground blades are required.

The lead time for disconnect switches is currently 28 to 32 weeks.

6.3. INSTRUMENT TRANSFORMERS

A ring bus configuration requires 3 phase voltage indication on each line and single phase voltage indication on the transformer for relaying, indication metering and synchronizing.

A total of seven 115-kV voltage or coupling capacitor voltage transformers (CCVTs) are required. The lead time for the CCVT's is currently 28 to 30 weeks.

6.4. STATION SERVICE POWER REQUIREMENTS

The facility must have a primary and a secondary source of station service power. The primary source will be from a 34,500-208/120V transformer and the secondary source would likely be served by a distribution line from the local utility. Other typical equipment required as part of station service is an automatic throw over switch, switchgear, AC distribution panel, 125V DC battery and battery chargers.

6.5. RELAY AND CONTROL REQUIREMENTS

The substation protection requirements are identified by zones of protection. The protection requirements identified for this project are:

- Pilot distance relaying for the Happy Jack 115-kV line
- Pilot distance relaying for the Miracle Mile 115-kV line
- Relay protection of Interconnecting Customer's Interconnecting Facilities.
- Breaker failure protection with transfer trip.

All zones of protection require separate primary and secondary relays for redundancy and to allow testing.

The control system must be able to operate by both local and remote means and must conform to Western's operations standard.

6.6. COMMUNICATION REQUIREMENTS

Communication is required from Western's operation center located in Loveland, Colorado to the substation to provide for remote control of equipment, obtain alarm, status, and metering data from the substation, relay communications requirements and provide a voice link to the substation.

The substation is less than seven miles to Western's Rock River Microwave site with a direct line of sight. A 7 GHz MW radio could be used with an antenna mounted on a 50-75 foot high communication structure. Western will design, procure, and install all communication equipment necessary for communication from the substation to Western's operation center.

6.7. METERING

Revenue quality metering equipment is required at the facility which must meet Western's Standard Meter Requirements. Metering equipment includes 3 phase revenue quality instrument transformers (voltage and current) and a revenue meter. The metering point may be either on the 115-kV or the 34.5-kV side of the power transformer. If the metering point is the low side of the transformer, Western will assess transformer loss to the values. Losses are derived from the manufacture's test reports. If

loss information from the test reports is not provided, Western will assess a 2% loss factor.

6.8. CONTROL BUILDING

The control building size is estimated to be 30x40 feet or 1200 square feet. General building requirements are redundant HVAC systems, raised access floor, AC and DC distribution panels, and separate battery room.

7. OPERATION

Western would have operational control of all equipment installed in the transmission path. Therefore, the 115-kV equipment would be operated remotely via SCADA from Western's control center located in Loveland, Colorado, or locally at the substation.

8. LAND

Land requirements can not be accurately determined without topography and preliminary layout design. Substations of this voltage and size typically require 3-5 acres depending upon orientation, drainage requirements, and approach spans of the transmission lines.

Land acquisitions costs can not be accurately determined without performing an appraisal. Assuming $10,000/acre based upon a recent Wyoming substation project, land cost estimate for 5 acres is $50,000.

9. ENVIRONMENTAL

Western requires an Environmental Assessment ("EA") to comply with National Environmental Policy Act requirements. The following assumptions were taken into account in preparing the estimate:

1. The Bureau of Land Management will be the lead agency on the Environmental Assessment and Western will cooperate with BLM on that document and use it to satisfy its requirements.
2. The Applicant or BLM procures, manages the contractors for cultural and biological surveys and reports to the BLM and Western specifications and the requirements of the regulatory agencies.
3. The project is not expected to be controversial and extensive public involvement is not anticipated.
4. The Applicant undertakes the day-to-day coordination with involved agencies and participation in project-related meetings with local and state agencies (e.g. Counties, cities).

The estimate for Western's cost for the EA is $23,000.

10. CONSTRUCTION

The facility construction will be planned to minimize outages to Western's transmission lines. In order to reduce line outages and impact to other customers along the line, Western anticipates requiring a shoo-fly on the transmission line for installation of the 115-kV transmission line tap structures.

Detailed construction outage requirements are determined during design.

Note: Western's project to rebuild the Cheyenne-Miracle Mile 115-kV line is planned for construction from 2007-2009. Outage requirements for Western's project will take precedent over any conflict for outage requirements for the Sand Hills Substation.

11. COMMISSIONING

The commissioning work includes a complete checkout and testing of all electrical equipment including power circuit breakers, power transformers, disconnect switches, instrument transformers; checkout and testing of the relay, control, and metering circuits; and checkout and testing of auxiliary equipment, such as the station batteries.

12. SCHEDULE

The customer requested a date for having the generation facility on-line on or before October 31, 2007. This date is neither reasonable nor achievable. There are substantial lead times involved in procuring electrical equipment as well as performing design and construction. The table below contains a detailed schedule that Western feels is reasonable to achieve. It should be noted that to meet this schedule, there are many milestones that can not slip.

Western is prepared to meet the proposed schedule in this document if the Customer executes the Large Generator Engineering & Procurement Agreement as shown. If the project is delayed, Western will reevaluate equipment lead times, workload, and construction seasons to determine a reasonable schedule.

To meet the final agreed upon schedule for this project, there must be timely contract execution and submittals of funds by 2003-G1. Western can not legally proceed with the project without sufficient contracts and advance funding.

PROPOSED PROJECT SCHEDULE

(all dates are end of month)

Activity	Start	Completion
Large Generator Engineering & Procurement Agreement	July 2006	August 2006
Planning	August 2006	September 2006
Field Data	September 2006	November 2006
Environmental	July 2006	April 2007
Large Generator Interconnection Agreement		April 2007
Land Acquisition	October 2006	December 2006
Design	October 2006	February 2007
Order Breakers	March 2007	August 2007
Construction Contract Procurement	April 2007	June 2007
Award of Construction Contract		June 2007
Construction Contract Performance Period *	July 2007	January 2008
Commissioning	February 2008	April 2008
In-service Date		April 2008

*Construction Notice to Proceed can not occur prior to execution of LGIA

ATTACHMENT A

COST ESTIMATE

2003-G1.
Design and Construction Budgetary Cost Estimates
June 29, 2006

Description	Cost
Construction Costs	$ 1,830,000
Communication Equipment	$ 210,000
Shoo-fly construction & removal	$ 100,000
Land	$ 50,000
Western Labor Costs	
Planning/Field Data	$ 25,000
Environment	$ 23,000
Design	$ 415,000
Construction Management	$ 300,000
Commissioning	$ 200,000
Project Management	$ 50,000
Procurement/Contract Administration	$ 10,000
TOTAL	$3,213,000

Notes:

1. The above is a budgetary level estimate intended to be accurate to +/-20%
2. The estimate does not include the design and construction cost of a new access road to the substation, if it is required.

ATTACHMENT B

PROPOSED SWITCHING DIAGRAM